

Amendments to the Claims

The listing of claims will replace all prior versions, and listings of claims in the application.

1. (previously presented): A nozzle for an injection molding apparatus, comprising:
 - a nozzle body, said nozzle body defining a nozzle body melt passage, said nozzle body melt passage having an inlet downstream from and in fluid communication with a melt source;
 - a heater coupled to said nozzle body;
 - a tip, said tip defining a tip melt passage downstream from and in communication with said nozzle body melt passage, said tip melt passage having an outlet upstream from a gate in a mold component, said tip including a tip gap seal surface; and
 - a tip retainer, wherein said tip is retained in position with respect to the nozzle body via said tip retainer and wherein said tip retainer includes a first tip retainer gap seal surface,wherein said first tip retainer gap seal surface and said tip gap seal surface are separated by a first gap and said first gap is sized to inhibit the flow of melt therein.
2. (original): A nozzle as claimed in claim 1, wherein said tip is made from a thermally conductive material.
3. (original): A nozzle as claimed in claim 2, wherein said tip retainer is made from a material that is less thermally conductive than the material of said tip.

4. (previously presented): A nozzle as claimed in claim 1, further comprising a seal between said tip retainer and said mold component.
5. (original): A nozzle as claimed in claim 1, wherein said tip retainer is configured to cooperate with said mold component to align said nozzle with respect to said gate.
6. (previously presented): A nozzle as claimed in claim 1, wherein the size of the first gap is between approximately .02 mm and .07 mm.
7. (previously presented): A nozzle as claimed in claim 1, wherein the tip further includes a tip mechanical seal surface adjacent the tip gap seal surface and wherein the tip retainer further includes a tip retainer mechanical seal surface adjacent the first tip retainer gap seal surface, wherein said tip mechanical seal surface engages the tip retainer mechanical seal surface to form a mechanical seal, and wherein the tip mechanical seal surface and the tip retainer mechanical seal surface are positioned upstream of said tip retainer.
8. (previously presented): A nozzle as claimed in claim 7, wherein the size of the first gap is between approximately .05 mm and .35 mm.
9. (previously presented): A nozzle as claimed in claim 7, wherein the size of the first gap is approximately .15 mm.

10. (previously presented): A nozzle as claimed in claim 1, wherein the tip includes a conical portion that extends into the gate.

11. (previously presented): A nozzle for an injection molding apparatus, comprising:

a nozzle body, said nozzle body defining a nozzle body melt passage having an inlet downstream from and in fluid communication with a melt source;

a heater coupled to said nozzle body;

a tip, said tip defining a tip melt passage downstream from said nozzle body melt passage, said tip melt passage having an outlet upstream from a gate in a mold component, said nozzle tip including a tip gap sealing surface; and

a seal piece connected to said nozzle body, including a seal between said seal piece and said mold component, wherein said seal inhibits melt leakage therepast, wherein said seal piece includes a first seal piece gap seal surface,

wherein said first seal piece gap seal surface and said tip gap sealing surface are separated by a first gap and said first gap is sized to inhibit the flow of melt therein.

12. (original): A nozzle as claimed in claim 11, wherein said tip is made from a thermally conductive material.

13. (original): A nozzle as claimed in claim 12, wherein said seal piece is made from a material that is less thermally conductive than the material of said tip.

14. (original): A nozzle as claimed in claim 11, wherein said seal piece is configured to cooperate with said mold component to align said nozzle with respect to said gate.

15. (previously presented): A nozzle as claimed in claim 11, wherein said tip is retained in position with respect to the nozzle body via said seal piece.

16. (previously presented): A nozzle as claimed in claim 11, wherein said tip is removably connected to said nozzle body.

17. (previously presented): A nozzle as claimed in claim 11, wherein the size of said first gap is between approximately .02 mm and .07 mm.

18. (previously presented): A nozzle as claimed in claim 11, wherein the tip further includes a tip mechanical seal surface adjacent the tip gap seal surface and wherein the seal piece further includes a seal piece mechanical seal surface adjacent the first seal piece gap seal surface, wherein said tip mechanical seal surface engages the seal piece mechanical seal surface to form a mechanical seal, and wherein the tip mechanical seal surface and the seal piece mechanical seal surface are positioned upstream from said seal piece.

19. (previously presented): A nozzle as claimed in claim 18, wherein the size of the first gap is between approximately .05 mm and .35 mm.

20. (previously presented): A nozzle as claimed in claim 18, wherein the size of the first gap is approximately .15 mm.

21. (previously presented): A nozzle as claimed in claim 11, wherein the tip includes a conical portion that extends into the gate.

22. (previously presented): A nozzle for an injection molding apparatus, comprising:

a nozzle body, said nozzle body defining a nozzle body melt passage, said nozzle body melt passage having an inlet downstream from and in fluid communication with a melt source;

a heater coupled to said nozzle body;

a tip, said tip defining a tip melt passage downstream from and in communication with said nozzle body melt passage, said tip melt passage having an outlet that is upstream from a gate in a mold component, said tip including a tip sealing surface;

a tip retainer connected to the nozzle body, wherein said tip is retained in position with respect to the nozzle body via said tip retainer and, wherein said tip retainer includes a tip retainer sealing surface; and

a seal piece connected to said tip retainer, including a seal between said seal piece and said mold component, wherein said seal inhibits melt leakage therepast and wherein said seal piece includes a seal piece sealing surface,

wherein said tip retainer sealing surface and said tip sealing surface are separated by a first gap and said first gap is sized to inhibit the flow of melt therein.

23. (original): A nozzle as claimed in claim 22, wherein said tip is made from a thermally conductive material.

24. (original): A nozzle as claimed in claim 23, wherein said tip retainer is made from a thermally conductive material, and wherein said seal piece is made from a material that is less thermally conductive than the material of said tip retainer.

25. (previously presented): A nozzle as claimed in claim 22, wherein said first gap size is between approximately .02 mm and .07 mm.

26. (previously presented): A nozzle as claimed in claim 22, wherein the tip further includes a tip mechanical seal surface adjacent the tip sealing surface and wherein the tip retainer further includes a tip retainer mechanical seal surface adjacent the tip retainer sealing surface, wherein said tip mechanical seal surface engages the tip retainer mechanical seal surface to form a mechanical seal, and wherein the tip mechanical seal surface and the tip retainer mechanical seal surface are positioned upstream from said tip retainer.

27. (previously presented): A nozzle as claimed in claim 26, wherein the size of the first gap is between approximately .05 mm and .35 mm.

28. (previously presented): A nozzle as claimed in claim 26, wherein the size of the first gap is approximately .15 mm.

29. (previously presented): A nozzle as claimed in claim 22, wherein the tip includes a conical portion that extends into the gate.

30. (previously presented): An injection molding apparatus, comprising:

a mold component and at least one nozzle;

wherein the mold component defines at least one mold cavity having a gate leading thereto and includes a mold component gap seal surface,

wherein the at least one nozzle includes a nozzle body, a heater, a tip and a tip retainer,

wherein the nozzle body defines a nozzle body melt passage, said nozzle body melt passage having an inlet downstream from and in fluid communication with a melt source;

wherein the heater is coupled to said nozzle body;

wherein the tip defines a tip melt passage downstream from and in communication with said nozzle body melt passage, said tip melt passage having an outlet that is upstream from the at least one gate, said nozzle tip including a tip gap seal surface; and

wherein said tip is retained in position with respect to the nozzle body via said tip retainer and wherein said tip retainer includes a first tip retainer gap seal surface and a second tip retainer gap seal surface,

wherein said first tip retainer gap seal surface and said tip gap seal surface are separated by a first gap and said second tip retainer gap seal surface and said mold component gap seal surface are separated by a second gap, and said first gap and said second gap are sized to inhibit the flow of melt therein.

31. (original): A nozzle as claimed in claim 30, wherein said tip is made from a thermally conductive material.

32. (original): A nozzle as claimed in claim 31, wherein said tip retainer is made from a material that is less thermally conductive than the material of said tip.

33. (cancelled).

34. (original): A nozzle as claimed in claim 30, wherein said tip retainer is configured to cooperate with said mold component to align said nozzle with respect to said gate.

35. (previously presented): A nozzle as claimed in claim 30, wherein the size of one of said first gap and second gap is between approximately .02 mm and .07 mm.

36. (previously presented): A nozzle as claimed in claim 30, wherein the tip further includes a tip mechanical seal surface adjacent the tip gap seal surface and wherein the tip retainer further includes a tip retainer mechanical seal surface adjacent the first tip retainer gap seal surface, wherein said tip mechanical seal surface engages the tip retainer mechanical seal surface to form a mechanical seal, and wherein the tip mechanical seal surface and tip retainer mechanical seal surface are positioned upstream from said tip retainer.

37. (previously presented): A nozzle as claimed in claim 36, wherein the size of the first gap is between approximately .05 mm and .35 mm.

38. (previously presented): A nozzle as claimed in claim 36, wherein the size of the first gap is approximately .15 mm.

39. (cancelled).

40. (previously presented): A nozzle as claimed in claim 30, wherein the tip includes a conical portion that extends into the gate.

41. (previously presented): A nozzle as claimed in claim 40, wherein the nozzle and the mold component together define a chamber surrounding the gate, and wherein the tip retainer further includes a tip retainer mechanical seal surface and the mold component further includes a mold component mechanical seal surface, wherein said tip retainer mechanical seal surface engages said mold component mechanical seal surface to form a mechanical seal, and wherein the tip retainer mechanical seal surface and the mold component mechanical seal surface are positioned adjacent said second gap.

42. (previously presented): A nozzle as claimed in claim 1, wherein said tip is removably retained in position with respect to the nozzle body via seal tip retainer.

43. (previously presented): A nozzle as claimed in claim 4, wherein said tip retainer includes a second tip retainer gap seal surface and said mold component includes a mold component gap seal surface and wherein said second tip retainer gap seal surface and said mold component gap seal surface are separated by a second gap, and said second gap is sized to inhibit the flow of melt therein.

44. (previously presented): A nozzle as claimed in claim 11, wherein said seal piece includes a second seal piece gap seal surface and said mold component includes a mold component gap seal surface and wherein said second seal piece gap seal surface and said mold component gap seal surface are separated by a second gap, and said second gap is sized to inhibit the flow of melt therein.

45. (previously presented): A nozzle as claimed in claim 16, wherein said seal piece and said tip are entirely free of contact with each other.

46. (previously presented): A nozzle as claimed in claim 22, wherein said tip is removably retained in position with respect to said nozzle body via said tip retainer.

47. (previously presented): A nozzle as claimed in claim 30, wherein said tip is removably retained in position with respect to said nozzle body via said tip retainer.